SPECIFICATION AMENDMENTS

Add the following new paragraph at page 2, line 1:

This application is a divisional application of commonly assigned U.S. Patent No. 6,726,433, filed July 13, 2000, U.S. Patent No. 6,113,346, filed August 7, 1996, and U.S. Patent No. 5,738,014, filed July 31, 1996, all three patents incorporated herein by reference.

Replace the paragraph beginning at page 2, line 2 with:

Printing processes utilize a vast array of different technologies to transfer written content to various distribution media. Organizations using varying printing processes include modest-volume quick printers, book and financial publishers, newspaper companies, forms companies, all sizes of commercial printers (for advertising etc.), and, publication printers (for magazines and periodicals). These types of organizations have a common process whereby information is transferred from some original layout form to an intermediate aluminum or polyester plate material which is then hung on a standard printing press to enable multiple identical replication of that information on paper or some similar print media.

Replace the paragraph beginning at page 2, line 18 with:

Recently the development of computer-to-plate, hereinafter C2P, systems and processes have provided alternative printing options. The C2P process eliminates the film as an intermediate transfer mechanism and allows the optical exposure of the plate directly. This reduces the number of steps required in the printing process of the information and potentially reduces the cost related to the generation of the intermediate film and its handling. C2P systems more readily allow a process which creates plates for shorter-run printing (below around 50,000 impressions).

Replace the paragraph beginning at page 2, line 24 with:

In basic terms, a C2P system accepts input jobs/pages written in a page description language, for example, POSTSCRIPT®. These jobs are controlled through execution by priority and scheduling workflow software. Jobs are then sent through a raster image processor to a platemaker for exposure. The data is being transformed throughout this process. The platemaker engine takes this data and prints it on a metal sheet of aluminum

which is later notched, bent, hung on the press, inked and made ready to image paper. An imaging engine and process for imaging a plate is described in commonly owned US Patent 5,345,870, hereby incorporated by reference into the present application.

Replace the paragraph beginning at page 4, line 3 with:

Accordingly it is an object of the present invention to provide an automated C2P system having a workflow software capable of controlling and sequencing the tasks performed by the C2P system from accepting a job input to the system as POSTSCRIPT® and output the job from the system as exposed images on printing plates.

Replace the paragraph beginning at page 5, line 17 with:

The objects and features of the invention will be better understood and further objects and advantages of the invention will become apparent in the following detailed description of the invention, when taken with the accompanying drawing(s), in which:

Replace the paragraph beginning at page 7, line 6 with:

The primary function of the handler 18 is to make plates 26 available on demand to the imaging engine 20. A multitude of plates 26 are stacked in each cassette 24 and the cassettes 24 are side-loaded into the handler 18 by an operator. Between each plate in a stack there may be a protective interleaf sheet or slip sheet which is removed by the handler 18 and discarded by a slip sheet removal mechanism 25. The handler 18 receives commands from the engine 20 by workflow software, which provides instructions to the handler 18 about what cassette 24 needs to be accessed to make a plate available to the picker 28 so the plate may be conveyed to the imaging engine 20. The handler 18 in turn provides status information to the engine 20 through the workflow software to make full interaction with the system 10 possible.

Replace the paragraph beginning at page 7, line 15 with:

The front-end 12 sends data to the engine 20 through an interface connection. Typically this data represents a "job" which requires the imaging of plates. This data contains information about the job's requirements, such as the type of plate, its size and plate thickness, the number of plates that are part of the same job, etc. The engine 20 interfaces electrically with the handler 18 to exchange machine functional and operation data which is

input into the workflow software. The handler 18, through the engine 20, sends data to the workflow software from data stored in each loaded cassette 26 representing plate size and quantities available in the cassettes 24. The handler 18 includes a device 61 for reading an ID tag 187, for example, a conventional bar-code reader on each cassette which has a description of the plate type inside. This ID tag 187 is in the form of a bar-code or other means. If a required plate size is unavailable, the engine 20 notifies an operator through a platemaker control terminal 30, so the operator can load the needed cassette into the handler 18. The engine 20 passes information to the handler 18 defining the next plate size or thickness required for imaging and which cassette 24 is to be placed in the queue, or in the correct position for access by the picker 28. The cassettes 24 store different sizes and/or thicknesses of plates 26 so the handler 18 positions a specific cassette 24 so that the picker 28 can access the required plate inside the specific cassette. The handler 18 insures the slip sheet, if present, has been removed from the surface of the top plate with the slip sheet removal mechanism 25. The picker 28 then moves over the positioned cassette, the plate is "picked," and the picker 28 returns to the imaging engine (home) position to deliver the plate. The imaging engine 20 accepts the plate and while the picker is in the engine 20 in the home position, the handler 18 is free to position the cassettes 24 in preparation for the next plate to be imaged.

Replace the paragraph beginning at page 9, line 24 with:

Referring now to **Fig. 4**, the picker 28 is shown supported on parallel rails 90 which are fixed to the interior of the engine compartment 20 (Fig. 1). Complementary rails 92 are mounted inside of the handler 18 as shown cross section in Fig. 2 and isometrically in Fig. 3, allowing the picker to move smoothly between the engine 20 and handler 18. The rails 92 inside the handler are secured to the support beams 46 of the handler frame 32. The picker 28 has a carriage 94 which is supported on the rails (90 or 92 depending on whether the handler is in the engine or the picker respectively) by three guide wheels 96 which engage the rails 90 (or 92) on each side of the carriage 94. Also two friction wheels 98 engage the rails 90 (or 92). The friction wheels 98 are driven by a motor 100 mounted on the carriage 94 through a connection to a drive shaft 102 and a belt and pulley mechanism 104 on each side of the carriage 94. The motor 100 operates in two directions to effectively propel the picker carriage 94 in forward and reverse from the engine compartment 20 to the handler 18. The carriage 94 supports three rows 106, 108, 110 of suction cups and an associated vacuum manifold 112

and vacuum tubing (not shown) between the manifold 112 and the three rows 106, 108, 110 of suction cups. The suction cups 114 are mounted on spring loaded fittings 116 to allow compression of the suction cups 114 against a plate during picking to ensure attachment of the plate to the picker 28. The first row 106 of suction cups that extends the furthest into the handler 18 is pivotable with respect to the carriage 94. An eccentric drive 118 and linkage 120 pivots the first row 106 of suction cups in a "peeling" motion. The eccentric 118 is driven by a motor 122 mounted on the carriage 94 to break or peel the edge of the plate being picked away from the stack. The middle row 108 of suction cups remains fixed with respect to the picker carriage 94. The third row 110 of suction cups slides out from the middle row 108 of suction cups. Two rails 124, 126 are mounted for sliding through complementary bearings (not shown) in the carriage body 94 on the both sides of the picker 28. On the right side of the picker viewed in Fig. 4, the rail 126 has a friction drive wheel (not shown) in driving contact with the rail 126. The drive wheel is driven by a drive motor 128 through a belt and pulley mechanism (not shown), all of which are mounted to the carriage body 94 so as to transmit rotary motion of the drive wheel into linear motion of the rails 126, 124 relative to the carriage body 94. The third row 110 of suction cups being movable relative to the other rows 106, 108 of suction cups expands the overall size of the picker 28 and the coverage area of the suction cups 114 to accommodate for various sized plates.

Replace the paragraph beginning at page 11, line3 with:

Fig. 5 illustrates a simplified top view of the picker 28 positioned over a cassette 24 in the handler. The first row 106 of suction cups 114 is positioned near an inner edge 130 of the cassette 24 against which the plates are referenced regardless of the plate size. Four different plates having different sizes are depicted by dashed lines and are indicated as plates A, B, C, and D. Plate A is the smallest plate and the middle row 108 of suction cups of the picker 28 is positioned near the opposite edge 132 of plate A from the reference edge 130. Vacuum is sequenced to four suction cups 114, two within row 106 and two within row 108 according to the size of plate A. The middle row 108 has a fixed position relative to the first row 106 (excepting that the first row is pivotable) to pick up plate A without the use of the third row 110 of suction cups. The third row 110 is shown in an extended position by solid lines, at the far edge 134 of the largest plate D opposite from the reference edge 130. The third row 110 of suction cups is also shown by dashed lines in a non-extended position. The third row 110

of suction cups is used to expand the size of the picker 28 to cover the areas for various size plates, such as B, C, and D, larger than the smallest plate A and smaller than or equal to the largest plate D, as indicated by arrow 136. Vacuum is sequenced to the suction cups 114 within rows 106, 108 and 110 according to the size of plats B, C and D. Arrow 138 shows the relative movement of the picker 28 including all three rows 106, 108, 110 of suction cups 114 with respect to the handler cassette 24 and the engine.

Replace the paragraph beginning at page 11, line 17 with:

Referring now to **Fig. 6**, the slip sheet removal mechanism is generally indicated as 25. The mechanism 25 is for the purpose of preventing a slip sheet 140 from sticking to the bottom of a plate 142 which is attached to the picker 28, securing the slip sheet 140 on the top of the stack of plates in a cassette 24 to the slip sheet removal mechanism 25, and subsequently completely removing the slip sheet 140 from the stack of plates in the cassette 24. The mechanism 25 comprises a plurality of suction tubes 144 mounted on a first pivotable shaft 146, an optional peeler air blast 148, a plurality of fingers 150 mounted on a second pivoting shaft 152, a plurality of nip wheels 154 mounted on a third pivoting shaft 156 (only one of each seen in drawing due to side view), and a rotatably driven roller 158 positioned below the nip wheels 154 which are in rolling contact during part of the slip sheet removal process, to be described hereinafter. A slip sheet detector device 902 is provided on one of the plurality of suction tubes 144. The detector device 902 provides a signal which is calibrated to provide a slip sheet present or not present condition to the handler 18. The suction tubes 144 are fixed to the pivoting shaft 146 to pivot upon being driven by motor 160 through a drive belt and pulley connection 162. The fingers 150 are fixed to pivoting shaft 152 which is driven by a similar drive connection to a motor (not shown). The nip wheels 154 are each mounted to an extension arm 164 which is attached to a bracket 166 mounted on the pivoting shaft 156. The extension arm 164 is spring loaded at the connection to the bracket to allow for the extension arm 164 to pivot or give slightly while pressure is applied between the nip wheel 154 and the roller 158. The shaft 156 is rotated in forward and reverse by the drive motor 168 through a drive belt and pulley connection 170. The roller 158 is driven by a motor 172 also through a belt and pulley connection 174. It will be understood by those skilled in the art that equivalent means for rotating the pivoting shafts 146, 152, 156, and rotating roller 158, may be substituted therefor without departing from the spirit of the invention. The

driven shafts and motors for driving the shafts are all mounted to a mounting bracket 176 which is connected to the support beams 46 of the handler 18. Operation of the slip sheet removal mechanism 25 will be described hereinafter.

Replace the paragraph beginning at page 13, line 21 with:

The side extrusions 186 are provided with a beveled portion 230 which aid in the loading of the cassette 24 into the plate handler 18. The handler 18 has a loading platform 232 shown in **Fig. 2**, extending horizontally from the vertical beams 46 of the handler. The loading platform 232 has rows of grooved wheels 234 mounted for rotation within the loading platform 232. The grooved wheels 234 cooperate with the beveled portion 230 of the side extrusions 186 of the cassette 24 during loading and serve to register the cassettes in a reference position within the handler. All tables 34 and 36 within the handler are also provided with the rows of grooved wheels to facilitate smooth and easy loading of the cassette from the loading platform onto the support tables in the handler, while maintaining the cassette in register. The beveled portions 230 cooperate with the V-grooved surface 236 of the grooved wheels 234 on opposite outer sides of the cassette 24 for proper alignment. The cassette is designed to align the plates inside the cassette against the reference blocks provided on the interior of the cassette, and also register the cassette into a reference position within the handler, as shown in Fig. 5, regardless of the plate size contained in the cassette. The parallel rails 92 in the handler are fixed relative to the wheels of the selected table in the access position. This ensures the registration of the plates within the cassette relative to the rails 92, and the registration is transferred to the complementary rails 90 in the engine compartment, and thereby the plate is delivered in register into the engine from the handler.

Replace the paragraph beginning at page 14, line 12 with:

Additional locator stops 238 are provided on each table to assist in registering the cassette 24 in the loading direction so that the cassette 24 is pushed into the handler 18 along the grooved wheels 234 of the table 36, but only to a predetermined location so that the cassette 24 is registered with respect to two dimensions and to the picker rails 92. These additional locator stops 238 are spring loaded and are located between the grooved wheels 234 within each row of grooved wheels on a table 36. The stops 238 contact an underside 240 of the side extrusions 186 while the cassette 24 is being loaded, and when the stop 238 comes into

contact with a recess (not shown) formed in the underside of the extrusion, the spring force behind the stop 238 forces the stop into the recess and locks the cassette 24 into a predetermined position on the table. The wheels 234 register the cassette with respect to the two reference blocks 206 on one side of the cassette, while the locator stops 238 within the rows of the wheels 234 register the cassette 24 with respect to the third, alone reference block 206 on the neighboring side of the cassette. Then the plates are registered in a known location relative to the picker, as depicted in Fig. 5.

Replace the paragraph beginning at page 16, line 15 with:

The picker 28 is then moved from the home position in the engine 20 into the handler 18 along the rails 90 and 92. Depending on the size of the plate in the selected cassette 24 the picker 28 adjusts the third row 110 of suction cups relative to the middle row 108 of suction cups to accommodate for various plate sizes, if necessary (Fig. 5). The elevator mechanism 40 moves the selected cassette 24 and plates therein upward to come into contact with the suction cups 114 on the picker 28 (Figs. 4 and 6). The suction cups 114 retract into the spring loaded fittings 116 to accommodate for variations in the stack height of the plates 26 in the cassettes 24, as the elevator 40 moves the cassette 24 up to the picking position which is at a set vertical height relative to the picker rails 90, 92. Therefore for a maximum stack height of a full stack of plates, the suction cups 114 compress against the spring loaded fittings 116 and retract a length into the fittings, and for a depleted stack of plates, the suction cups 114 compress against the spring loaded fittings and retract substantially the same length minus the height of the stack depletion. The spring loaded fittings 116 also ensure that the plate and the suction cups 114 make contact to secure the plate onto the picker 28. After the plate is attached to the picker 28 by the vacuum suction, the first row 106 of suction cups on the picker 28 is pivoted upward, peeling back the edge of the plate 142 and creating a gap between the plate 142 and the slip sheet 140 underneath.

Replace the paragraph beginning at page 17, line 5 with:

The slip sheet removal mechanism 25 activates the peeler air flow 148, and the fingers 150 are pivoted into position to hold down the edge of the slip sheet 140 while the elevator mechanism 40 lowers the cassette 24 to a slip sheet removal position. The peeler air blast 148 remains on while the cassette 24 moves downward to separate the slip sheet 140 from the

bottom of the plate 142 being picked by the picker 28, which may stick to the plate due to electrostatic charge. The fingers 150 are pivoted away from the slip sheet 140 and the suction tubes 144 are pivoted into position above the slip sheet edge. The suction cups on the ends of the suction tubes are compliant and flexible so that when the vacuum is applied and contact is made between a suction cup and the slip sheet, the slip sheet material is drawn into the suction cup and the separation of the slip sheet from the plate below it is initiated. The compliant suction cup deforms to break the slip sheet away from the lower plate as typically an attractive force exists between the slip sheet and the plate. This is also an important step in the process of removing the slip sheet because the slip sheet may be a porous material and the vacuum applied through the suction tubes can pass through the slip sheet material and be applied to the plate below, which is undesirable when attempting to remove the slip sheet. The selected cassette 24 is elevated to bring the slip sheet 140 into contact with the suction tubes 144 while the vacuum is on. The suction tubes 144 pivot upward slightly to break the adhesion of the slip sheet 140 to the plate below. The elevator 40 then moves the selected cassette 24 downward from the slip sheet removal mechanism 25 and the suction tubes 144 pivot back downward to the roller 158 with the slip sheet 140 attached. The vacuum for the suction tubes 144 is turned off and the slip sheet 140 is released to the rotating roller 158 to pull the slip sheet 140 away from the stack. The nip wheels 154 pivot from the position shown in solid lines to the position shown in dotted lines to cooperate with the roller 158 and remove the slip sheet 140. A sensor 902 indicates that the removal of the slip sheet 140 is completed and the rotating roller 158 is then halted. Meanwhile the picker 28 lowers the first row 106 of suction cups from the peeling position, and the picker 28 travels back into the engine 20 to the home position. For the next plate to be selected by the picker 28, the steps are partially repeated if the same cassette 24 is being picked from, or the steps are repeated from the beginning of the sequence for another cassette.

Replace the paragraph beginning at page 18, line 13 with:

The picker 28 is returned (if not already there) to begin in the home position within the engine 20. The slip sheet removal mechanism 25A is positioned with the suction tubes 144, fingers 150, and nip wheels 154 retracted (as shown in dotted lines for the suction tubes and nip wheels in Fig. 6) to clear the path of the tables 34, 36 for repositioning by the elevator mechanism 40. The elevator mechanism 40 moves the brace 38, lower table 36, and upper

tables 34 supported thereon, if any, to the cover removal/replacement position previously described. Then the support bars 56 and shafts 52 are turned 90 degrees by means of the linkage 60 and drive motor 64. Once the support bars 56 are retracted from the path of motion of the tables 34, 36, the elevator mechanism 40 moves to the cassette loading position for the selected table and cassette needing replacement. The cassette loading position is located where the selected table is adjacent to the loading platform 232 shown in Fig. 2 extending out from the handler 18 to support the cassette 24 to slide horizontally between the selected table and the loading platform 232 during loading and unloading. Covers and doors (not shown) are provided to enclose the entire handler frame to maintain the cassette in a light tight environment. The doors are provided to access the interior of the handler and at this time the door locks are released to allow operator access. Then the empty cassette is removed by sliding the cassette out horizontally along the path formed by the grooved wheels in the selected table and the loading platform, and then the cassette is either reloaded or replaced with another cassette. The cassette presence is monitored by sensors. After detecting the cassette on the selected table, the handler waits for the doors to be closed and then the door locks are activated. The elevator moves up to the cover removal/replacement position for the selected cassette and normal operation is resumed.

Replace the paragraph beginning at page 19, line 7 with:

It will be understood that the preferred embodiment of the system described herein being a platesetter for imaging aluminum plates, can be used also with polyester plates, can be modified to perform as a proofing device rather than a platesetter, such as in commonly owned, US Patent No. 5,699,099, entitled "Electronic Prepress System With Multi-Function Thermal Imaging Apparatus," hereby incorporated by reference. Additionally the apparatus described herein is applicable to production of thermally recorded printing plates as well as photosensitive lithographic printing plates recorded by light exposure, with various modification to the system's processing and imaging components, as appreciated by those familiar with the art.